

Log R-457

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C.

ISSUED: January 4, 1984

Forwarded to:

Mr. E. B. Burwell  
President  
Southern Railway System  
Post Office Box 1808  
Washington, D.C. 20013

SAFETY RECOMMENDATION(S)

R-83-103 through -105

About 5:55 a.m. on April 3, 1983, Amtrak passenger train No. 820 (The Crescent), en route from New Orleans, Louisiana, to Washington, D.C., with 331 passengers and 18 crewmembers aboard, derailed when it struck a landslide near Rockfish, Virginia, on Southern Railway System (SR) track about 23 miles south of Charlottesville, Virginia. Heavy rains in the area preceded the landslide. The track had been inspected 6 hours before the accident. The train was moving about 48 mph at the time of the accident. There was no train order in effect for reduced speed in the area of the derailment. Twenty-four persons were injured, and damage was estimated to be \$232,000. 1/

The route of The Crescent through central Virginia is through mountainous terrain where the SR track is laid through many cuts. The trainmaster's concern that the heavy rains in the area on April 2 might affect train operations prompted the issuance of train order No. 587 instructing SR crews to "run carefully, looking out for slides and washouts." However, the train order did not restrict train speed, and the engineer of train No. 820 did not interpret the order as requiring reduced speed. The dispatcher issued only one written slow order—for a section of track 17 miles north of the derailment site—which was in effect on April 2 and April 3 for both northbound and southbound trains. However, the trainmaster apparently was concerned enough about two other areas, including the area where the accident occurred, that he had issued the dispatcher oral instructions for southbound train No. 819 on April 2 to reduce speed. These instructions apparently were not to continue in effect and were not given to northbound train No. 820 on April 3, which went through the area about 9 hours later. The trainmaster's concern over the weather also led to special track inspections. However, the derailment area was last inspected about 6 hours before train No. 820 collided with the landslide.

The heavy rains in the derailment area stopped about 9:30 p.m. on April 2. The weather forecasts on April 2 stated that the line of heavy showers and thunderstorms would be moving out of the area. The discontinuance of track inspections in the derailment area and the failure either to continue in effect the oral instruction to reduce speed in the derailment area on April 3 or to issue a written train order apparently were the result of the trainmaster's reduced concern over the effect of the weather on train operations once the rain ceased.

1/ For more detailed information read Railroad Accident Report—"Derailment of Amtrak Train No. 820 (The Crescent), on Southern Railway System Track, Rockfish, Virginia, April 3, 1983" (NTSB/RAR-83/10).

From the beginning, the SR's initial response to the weather situation was not effective. Train order No. 587's instruction to "run carefully" was ambiguous and did not require operating practices that would allow the engineer to perceive an obstruction and avoid a serious accident. Since operating rule 1013 that requires engineers to "take necessary precautions . . . during or after heavy rain . . ." is only a general precautionary rule, it must be supplemented by train orders or special instructions to make the rule meaningful. Under the SR rules, unless he encounters actually hazardous conditions, the engineer is not permitted to reduce timetable speed except by specific train order or special instruction; accordingly, the engineer of train No. 820 was operating the train as authorized at the time of the accident.

Even if the train had been moving at 25 mph, the speed required in the area by the trainmaster's oral instruction on the day before, the accident might not have been prevented because of the limited sight distance at the curve. Because of the curve, the engineer did not see the landslide until the train was within 200 feet of it. In order for the train to have been stopped in that distance, its speed would have to have been no more than 10 mph. The end of the rain, the termination of the special track inspections, and the absence of special track instructions, all of which the engineer had encountered the night before, may have given the engineer of train No. 820 a false assurance that the track ahead was clear for normal operations.

The SR had more than adequate time to conduct a track inspection ahead of train No. 820, which was carrying 331 passengers. The last inspection should have been made closer to the time that train No. 820 would pass through the area to make likely the detection of a slide. The SR management should have been aware that the threat of landslides is not eliminated when heavy rain ceases. Landslides can occur hours or days later as a result of heavy rain, as happened in this case. Moreover, the landslide that occurred nearby in 1982 occurred after a lesser amount of rainfall than in this case and occurred after the rain had stopped.

The SR should review its procedures concerning train orders related to weather conditions. The SR should specify, in unambiguous terms, conditions under which the train orders will be issued and the specific actions which are to be taken by a train's crewmembers to comply with the train orders. The SR also should review its practices regarding track inspections and patrols to ensure that they are timely and effective in reducing the risk of a train encountering operating hazards.

The Safety Board recognizes that many railroads have general precautionary operating rules similar to SR rule 1013. Rule 1013 will not be effective in adverse weather situations unless it is supplemented by specific instructions or train orders. All railroads should review and supplement as necessary their operating rules and practices to make them more effective in predictable albeit abnormal operating situations.

Land stabilization along railroad rights-of-way is a universal problem. There are many areas where track was laid decades ago in cuts and other areas that do not meet current construction standards. Some of these areas, especially in mountainous terrain, cannot be modified to eliminate the landslide hazard. Thousands of slides that occur in the United States each year are detected before a train strikes them. Railroads have used many methods, such as slide detection fences and track inspections, to deal with unstable areas. Many railroads operating in the same area and on the same terrain as the SR use slide detection fences. If the track at the accident site had been equipped with a slide detection fence, the landslide would have been detected, and the signal that train No. 820 passed about 1/2 mile before the accident site would have changed to red. Unless the landslide had happened only minutes before train No. 820 approached, a slide detection fence probably would have prevented this accident.

The best methods of reducing the hazard of landslides, however, are methods that both predict and attempt to prevent landslides. The stability of a slope can be determined by the measurement of the displacement of earth or rocks. Stakes driven into the ground in slide areas and instrumentation such as tilt meters (inclinometers) can be used to determine movement. Although SR records show that the slope at MP 135.2 had remained stable since 1860, the leaning of the trees on the slope should have alerted someone to the possibility that some earth movement had occurred before this landslide. A slide causing a derailment had occurred 13 months before at a similar slope 0.7 mile south of the accident site. The Rockfish area had received 7.75 inches of rain in the 30 days preceding the April 3 slide. The trainmaster's oral instruction to southbound train No. 819 showed that he was concerned about the possibility of a slide or washout in the accident area. Consideration of all these circumstances should have caused the SR to be more cautious about train movements in the area on April 3 even though the heavy rains had stopped, and should have prompted the SR to examine closely the slope stability in the area of heavy rain.

The SR should examine periodically its rights-of-way to determine where unstable slopes exist and eliminate the hazards they pose for railroad operations. The American Railway Engineering Association (AREA) has issued recommended practices for the maintenance of earth and rock slopes on railroad rights-of-way. Many of these practices concerning stabilization, protection, and warning methods apparently were not used by the SR at this accident site. The SR should adopt the recommended practices of the AREA, and should undertake planning for a stabilization program promptly.

Therefore, the National Transportation Safety Board recommends that the Southern Railway System:

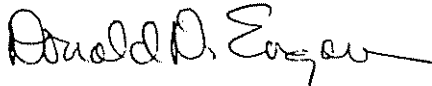

Revise procedures for train orders related to weather conditions to prescribe conditions under which the train orders should be issued, and specific actions to be taken by crewmembers so that the risk of operating hazards caused by weather will be minimized. (Class II, Priority Action) (R-83-103)

Examine periodically its rights-of-way for unstable slope conditions, and eliminate these conditions where possible. Install slide detection devices or adopt other appropriate measures to detect landslides where unstable slope conditions cannot be eliminated. (Class II, Priority Action) (R-83-104)

Adopt the recommended practices of the American Railway Engineering Association regarding maintenance of earth and rock slopes. (Class II, Priority Action) (R-83-105)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (P.L. 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter.

GOLDMAN, Vice Chairman, and McADAMS, BURSLEY, and ENGEN, Members concurred in these recommendations. BURNETT, Chairman, did not participate.

  
By: Jim Burnett   
Chairman